

CHAPTER 5

BASIC PHOTOGRAPHIC TECHNIQUES

Today, photography is characterized by a rapid growth in the development of technology and ideas. Each year, millions of pictures are taken and an astonishing array of new films, cameras and imaging systems enter the market.

One of the great attractions of the photography field is the ease with which basic skills can be learned. Unlike some of the older arts that take years of training to produce an acceptable product, anyone can quickly learn how to take a picture; however, photographic techniques must be mastered before you can become an accomplished photographer; therefore, mastery of the basic fundamentals is the foundation upon which you will build your photographic and professional skills as a Navy Photographer's Mate. The photographic techniques presented in this chapter are essential in producing quality photographs, and you can apply each of these fundamentals, to some extent, each time you take a picture.

KEEPING THE CAMERA STEADY

Many photographs have been ruined because of camera movement. Unless you want a blurred picture, keeping your camera steady when shooting is crucial. The longer the exposure or focal-length lens you use, the more crucial holding your camera steady becomes; therefore, there are many instances when the use of a tripod or some other type of camera support is necessary.

The following section provides general guidelines for the various methods used to support a camera to ensure quality results. These are not necessarily the only or even the best ways to support a camera. You should practice supporting your camera using various methods; then select those that are most appropriate for the situation and the subject being photographed. Practice should include all the camera functions you normally use on actual photographic assignments. Concentrate on composing through the viewfinder, focusing, selecting shutter speeds and f/stops, holding

the flash off the camera, depressing the shutter release, and winding the film.

HANDHOLDING THE CAMERA

Of the various methods to keep your camera steady, the best is to use a tripod, but often you may not have one with you or the situation makes the use of a tripod impossible. In these situations, if you use proper precautions, it is possible to take high-quality pictures using hand-held methods.

Under normal circumstances, you should not handhold your camera at shutter speeds longer than about 1/60 second. When a long lens is used, this becomes even more critical, because the images produced by long lenses are affected more by camera movement. Also, it is more difficult to control the weight and greater size of a long lens when it is hand-held. As a general rule, the slowest recommended shutter speed is the reciprocal of the focal length of the lens; for example, when you are using a 500mm lens, the slowest shutter speed you should use is 1/500 second. When handholding your camera, be sure to have a good, solid, but not tense grip on the camera. Use your whole body as a firm support. Your elbows should be close to your body and your feet spread apart to provide good balance. In this position your body is acting as a tripod. When possible, you should try steadying yourself by leaning against something solid like a wall, tree, or post.

When using an eye-level camera, press the camera against your forehead and face. A waist-level camera should be pulled solidly against your body. Just before releasing the shutter, take a deep breath, let out part of the air-hold the rest, and squeeze the shutter release as if firing a gun.

When nothing is available to support your camera other than yourself, try sitting down, squatting, or kneeling, and firmly rest your elbows on one or both knees. When you are taking low-angle photographs, lying on the ground with the camera in front of you is another simple way to keep the camera reasonably



Figure 5-1.—Handholding the camera.

steady. Even better results are obtained when you place the camera on a solid surface, such as a railing or a rock (fig.5-1).

When taking high-angle photographs with a twin-lens reflex or waist-level camera, you could hold

the camera steady upside down against a roof or other object within easy reach above your head, such as under a low archway or firm tree branch.

Portable and compact supports, such as pistol or rifle grips, are available for hand-held cameras. These

are particularly useful when covering fast events, when using long-focal-length lenses, or when a tripod is too cumbersome to use. These hand-held supports are usually fitted with a cable release for firing the shutter.

Camera shake can cause *fuzzy* photographs. Some cameras have built-in capabilities that help reduce camera vibration or shake; for instance, on a single-lens reflex (SLR) camera, the mirror “jumps” up when the shutter is fired—that causes vibration. On some SLRs you can lock the mirror up before taking the picture to avoid this; however, the disadvantage of locking the mirror is that you are unable to see through the viewfinder. Also, the pressure of your finger on the shutter release can cause some camera shake. This does not happen on cameras with a delayed shutter release because the camera compensates by automatically delaying the shutter release. Additionally, cable release can be used to fire the shutter without handling the camera

CAMERA SUPPORTS

To ensure absolutely sharp photographs, you must use some type of camera support. Few photographers can hold a camera absolutely steady, especially for exposures longer than about 1/60 second or even shorter exposures when using long-focal-length lenses. When using telephoto lenses or shooting motion media, you must remember that camera movement can become critical. Even the slightest camera movement is magnified and becomes very apparent in enlargements of still photographs or when motion-media footage is viewed.

The ideal camera support should be strong, firm, and allow as much adjustment of camera height and angle as possible. The design of a support to be carried outside the lab should be compact and lightweight, while still providing a firm, rigid camera support.

Most pictures are taken holding the camera by hand because camera supports are often bulky, heavy, and inconvenient to carry on many assignments; however, you should use a camera support when it is appropriate to do so. This allows you to produce the sharp pictures that are characteristic of a truly professional photographer.

Tripods

The best way to support your camera is with a sturdy, rigid, tripod. Tripods are three-legged camera supports with flat platforms or heads in which cameras are secured. Most tripods are equipped with a head that

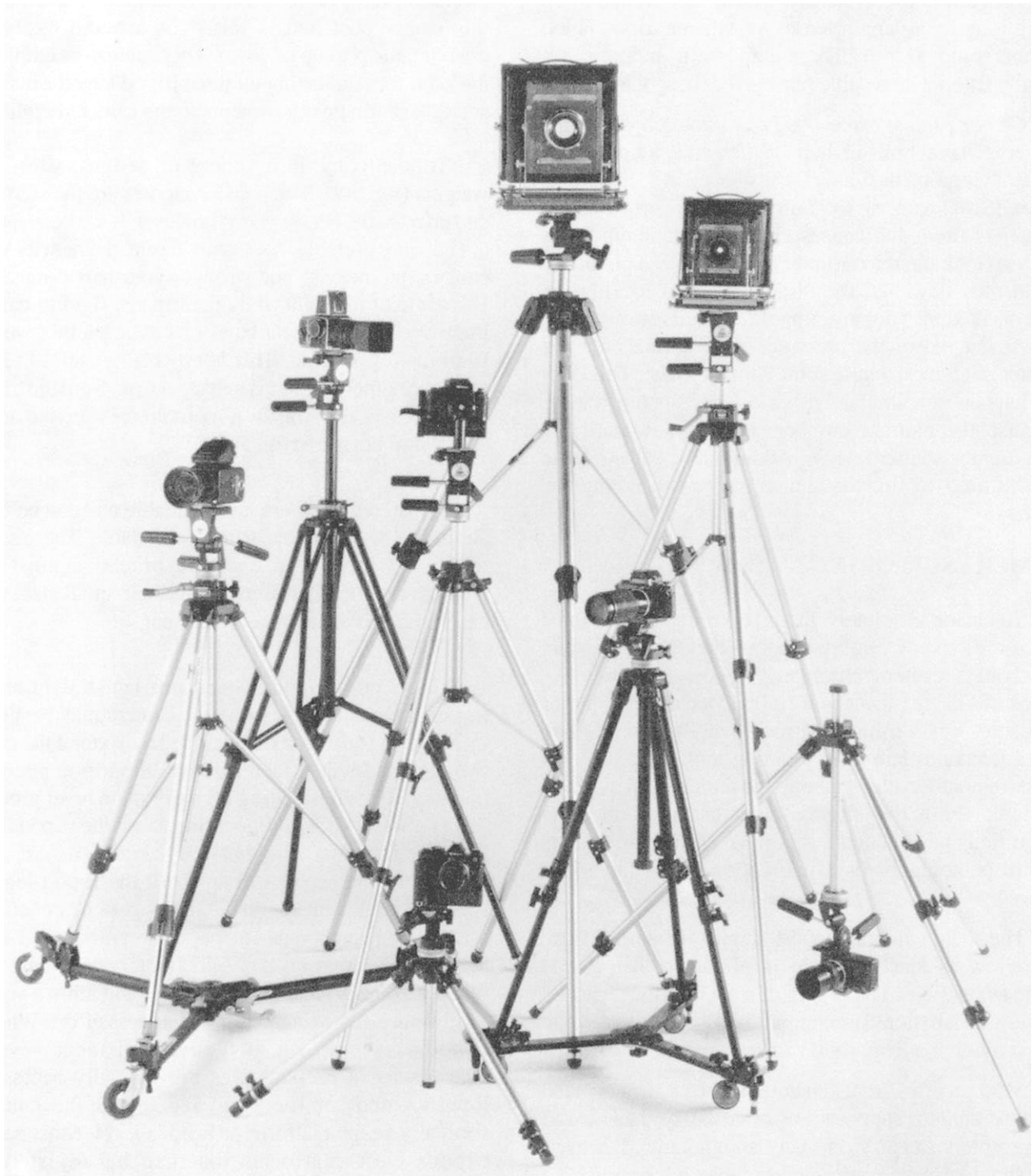
has an elevator center post. The camera is attached to this center post and is raised or lowered easily by cranking the post up or down. These elevators eliminate the need for readjusting all three tripod legs for making small, last minute adjustments to the camera height.

Tripods come in a variety of designs, sizes, and weights (fig. 5-2). The heavier models are the sturdiest and provide the best support; however, if too heavy, they are not very portable. As a general rule, the heavier your camera, the heavier and stronger your tripod must be. For some of the light, full-size tripods, rigidity can be improved by hanging a bag of sand or another weight from the tripod head. This is especially useful in high winds. Another method is to hang a strap from the tripod head, and use the strap as a foothold on which to apply downward pressure (fig. 5-3).

Tabletop tripods are also available and can be used almost anywhere a flat surface is available. These small tabletop tripods can even be braced against the photographer’s chest. Because of their small size, they can easily be carried in a camera bag.

To set up a tripod, extend one leg straight ahead toward the subject. This way the camera may be aimed by pivoting the tripod on this one leg. Extend the other two legs and adjust them to level the tripod platform horizontally. When setting up a tripod on level ground, you can waste a lot of time trying to get the tripod level if the leg sections are not fully extended. An easy solution to the problem is to mark the tripod legs in specific increments with a marking pen, pencil, or scribe. One method is to mark short lines at 1-inch intervals and long lines at 6-inch intervals. Doing this reduces your frustration, saves time, and allows you to level your camera on the tripod with less effort. When a tripod is set up on an uneven surface, several adjustments of the side legs are normally necessary. Readjustment of the front leg levels the camera vertically so the platform or head is level. Most newer tripods have platforms that can be adjusted by eliminating the need for minor leg adjustments.

To mount the camera on the tripod head, you secure it in place by tightening the tripod screw into the camera tripod socket. Secure the camera by tightening the camera clamp screw locknut. After the camera is mounted on the tripod, test the camera to ensure all camera controls are accessible and function properly. The camera should be stable and not shake when the camera controls are operated.



Courtesy of Bogan Photo Corp.
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Figure 5-2.—Tripods.

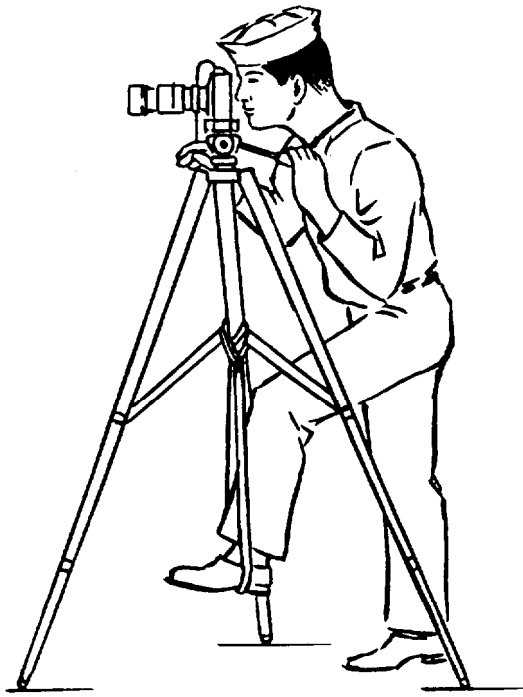


Figure 5-3.—Using a foot strap to make a tripod more rigid.



Figure 5-4.—Using a monopod.

Monopods

A monopod is a single pole on which a camera is mounted. Monopods are useful for keeping the camera steady for location work when a tripod is too bulky or difficult to use; however, the use of a monopod is not advisable when using large, heavy cameras or when shutter speeds below about 1/15 second are used. Standing or kneeling with a monopod braced against your body or leg provides a camera the extra support and steadiness required for it to be an effective tool (fig. 5-4).

Clamps

Another practical way to support your camera is to use one of the many clamps available for this purpose. A camera clamp has a mount that screws into the tripod hole or socket on the camera and has jaws that can be clamped to a convenient object. Camera support clamps can be attached to furniture, doors, posts, fences, and other firm anchor points. There are even clamps with suction cups for mounting cameras on smooth, flat surfaces, such as a window.

PHOTOGRAPHIC COMPOSITION

Photographic composition is *the pleasing arrangement of subject matter elements within the*

picture area. Creative photography depends foremost on the photographer's ability to see as the camera sees because a photograph does not reproduce a scene quite the way we see it. The camera sees and records only a small isolated part of the larger scene, reduces it to only two dimensions, frames it, and freezes it. It does not discriminate as we do. When we look at a scene we *selectively* see only the important elements and more or less ignore the rest. A camera, on the other hand, sees all the details within the field of view. This is the reason some of our pictures are often disappointing. Backgrounds may be cluttered with objects we do not remember, our subjects are smaller in the frame or less striking than we recall, or the entire scene may lack significance and life.

Good pictures are seldom created by chance. To make the most of any subject, you must understand the basic principles of composition. The way you arrange the elements of a scene within a picture, catch the viewer's attention, please the eye, or make a clear statement are all qualities of good composition. By developing photographic composition skills, you can produce photographs that suggest movement, life, depth, shape, and form, recreating the impact of the original scene.

How are photographic composition skills developed? You look, you study, you practice. Every time you take a picture, look all around within the viewfinder. Consider the way each element will be recorded and how it relates to the overall composition.

You must become thoroughly familiar with the camera and learn how the operation of each control alters the image. Experiment with the camera and look at the results carefully to see if they meet your expectations. With experience and knowledge of your equipment, you begin to “think through your camera” so you are free to concentrate on composition. Devote serious study to the principles of good composition. Study books and magazine articles on composition. You should analyze various media: motion pictures, TV, magazines, books and newspapers, and evaluate what you see. What is good about this picture or that TV image? What is bad about it? What principles of good composition could you apply in a different way to make the picture better.

Good or correct composition is impossible to define precisely. There are no hard-and-fast rules to follow that ensure good composition in every photograph. There are only the principles and elements that provide a means of achieving *pleasing* composition when applied properly. Some of these principles and elements are as follows:

- Center of interest
- Subject placement
- Simplicity
- Viewpoint and camera angle
- Balance
- Shapes and lines
- Pattern
- Volume
- Lighting
- Texture
- Tone
- Contrast
- Framing
- Foreground
- Background
- Perspective

As you study these principles of composition, you should soon come to a realization that some are very similar and overlap one another a great deal.

Because all or most of these principles must be considered and applied each time you take a picture, it

may all seem quite confusing at first. With experience you can develop a sense of composition, and your consideration and application of the principles will become almost second nature. This is not to suggest that you can allow yourself to become complacent or careless in the application of the principles of composition. Doing so will be immediately obvious because the results you produce will be snapshots, not professional photographs.

The principles of composition that follow apply equally to both still and motion media photography.

CENTER OF INTEREST

Each picture should have only one principal idea, topic, or *center of interest* to which the viewer's eyes are attracted. Subordinate elements within the picture must support and focus attention on the principal feature so it alone is emphasized.

A picture without a dominant center of interest or one with more than one dominant center of interest is puzzling to a viewer. Subsequently, the viewer becomes confused and wonders what the picture is all about. When the picture has one, and only one, dominant “point of interest,” the viewer quickly understands the picture.

NOTE: “Point of interest,” as used here, has the same meaning as center of interest; however, using the term *point of interest* prevents giving the impression that the center of interest should be located in the center of the picture.

The specific topic, idea, or object to be portrayed must be set in your mind as you prepare to take a picture. When there is nothing in the picture to attract attention to a particular area or object, the eyes wander throughout the scene. The center of interest may be a single object or numerous ones arranged so attention is directed to one definite area.

When the center of interest is a single object that fills most of the picture area or one that stands out boldly, such as a white sail against a background of dark water, attention is attracted immediately to it. As may be expected, not all subjects are as simple to arrange or as bold and impressive.

A photographer usually has at his or her disposal many factors or elements that can be used and arranged within the picture area to draw or direct attention to the primary idea of the picture. Some of these elements are lines, shapes, human figures, tone, and texture.

Human figures attract attention more strongly than almost any other subject matter and unless they are the

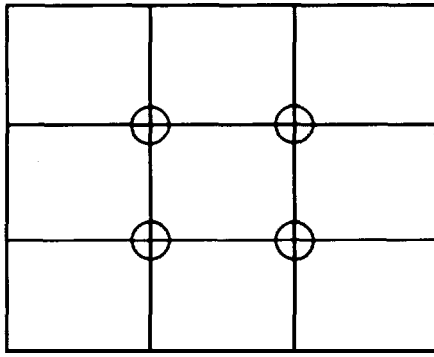


Figure 5-5.—Principle of thirds.

main object of the photograph should probably be kept out of the picture; for instance, a photograph showing a person standing at some distance in front of a building may leave the observer wondering whether the person or the building is the primary subject. When people are included in a scene for comparative size of objects or just for atmosphere, keep them from looking directly at the camera. When people look at the camera and therefore at the viewer of the picture, the viewer tends to return their gaze by looking directly back into their eyes. When they are not the intended point of interest, we miss the statement and purpose of the picture. When people are subordinate elements within the picture and they are looking in a direction other than at the camera, the viewer's attention is directed from the people to what *they are* looking at, which *should* be the center of interest; for example, when people are grouped around a piece of machinery that is the center of interest of the picture, have them look at the machine, rather than the camera.

SUBJECT PLACEMENT

Sometimes good composition is obtained by placing the center of interest in the geometrical center of the picture; it is generally not a good idea to place it there. Too frequently it divides the picture into equal halves and makes the picture uninteresting and difficult to balance. By dividing the picture area into thirds, both vertically and horizontally, and locating the center of interest at one of the intersections of the imaginary lines, you can usually create a feeling of balance to the composition (fig. 5-5).

In photographic composition there are two general guides for determining the best location for the center of interest. *The first is the principle of thirds. The other is dynamic symmetry.* In the principle of thirds, the intersection of lines that divide the picture area into

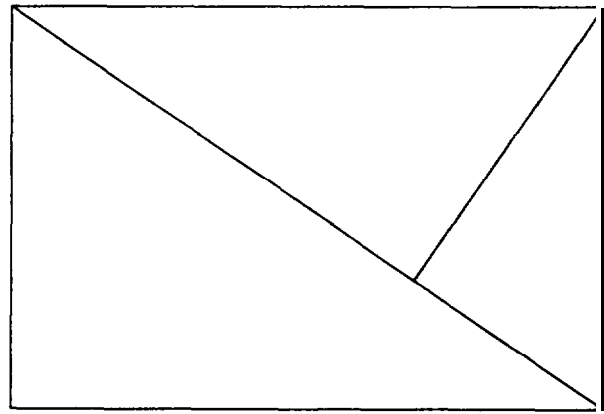


Figure 5-6.—Dynamic symmetry.

thirds are marked by O's. These intersections are good locations for the center of interest in most photographs. Notice we said *THE* center of interest. Remember, have only one center of interest to a picture—keep it simple. The principle of dynamic symmetry is a similar idea. A good location for the center of interest is found by drawing or imagining a diagonal line from one corner to an opposite corner. Then, draw a second line perpendicular to the first from a third corner (fig. 5-6). The intersections of the lines are the location for the center of interest.

SIMPLICITY

Simplicity is the key to most good pictures. The simpler and more direct a picture is, the clearer and stronger is the resulting statement. There are several things to be considered when we discuss simplicity. First, select a subject that lends itself to a simple arrangement; for example, instead of photographing an entire area that would confuse the viewer, frame in on some important element within the area. Second, select different viewpoints or camera angles. Move around the scene or object being photographed. View the scene through the camera viewfinder. Look at the foreground and background. Try high and low angles as well as normal eye-level viewpoints. Evaluate each view and angle. Only after considering all possibilities should you take the picture. See beyond and in front of your subject. Be sure there is nothing in the background to distract the viewer's attention from the main point of the picture. Likewise, check to see there is nothing objectional in the foreground to block the entrance of the human eye into the picture.

A last point of simplicity—*tell only one story*. Ensure there is only enough material in the picture to convey

one single idea. Although each picture is composed of numerous small parts and contributing elements, none should attract more of the viewer's attention than the primary object of the picture. The primary object is the reason the picture is being made in the first place; therefore, all other elements should merely support and emphasize the main object. Do not allow the scene to be cluttered with confusing elements and lines that detract from the primary point of the picture. Select a viewpoint that eliminates distractions so the principal subject is readily recognized. When numerous lines or shapes are competing for interest with the subject, it is difficult to recognize the primary object or determine why the picture was made.

VIEWPOINT AND CAMERA ANGLE

The proper viewpoint or camera angle is an important factor in good composition. Repositioning your subject within the viewfinder frame and changing the camera viewpoint or camera angle are two simple ways of controlling composition.

Photographing from a different viewpoint or camera angle can often add drama and excitement or even bring out an unusual aspect of a subject. Most of the subjects you photograph are three-dimensional and should be photographed from an angle (to the right or left of and/or from higher or lower than the subject) that allows the viewer to see more than one side of the subject. The photographer should study the subject from different sides and angles. Walk around the subject and look at it from all viewpoints. See it from elevated and low positions as well as from eye level to find the best composition. This greatly assists in composing the subject for the best balance and helps to select a background that compliments, not distracts from the subject.

The terms *viewpoint* and *camera angle* are often used in conjunction with one another and sometimes used interchangeably. They can also have different meanings depending on how they are applied. Viewpoint" is the camera position in relationship to the subject. "Camera angle" is the angle in which the camera lens is tilted; for example, a picture of sailors marching, made from ground level with the camera held horizontal with reference to the ground, may be referred to as a "low viewpoint" (or camera position); however, when this picture is made, again from ground level, but with the camera pointed up, it may be referred to as a "low camera angle." Likewise, a picture made from an elevated or high position, with the camera again held horizontal with reference to the ground, or even pointed

straight down, can be referred to as a "high viewpoint"; however, if the camera is not held horizontal to the ground or pointed straight down, but pointed at some angle between horizontal and vertical, the camera position could be referred to as a "high camera angle."

Eye-Level Shots

With the camera held horizontal, eye-level shots are usually made at a height of about 5 1/2 feet, the height from which the average adult sees, and with the camera horizontal. With the camera held at eye level but pointed up or down, the camera position changes and you have either a low or high camera angle, respectively.

Low Viewpoint and Low Camera Angle

Low viewpoints and low camera angles can add emphasis and interest to many ordinary photographs. A low viewpoint can be used to distort scale or add strength to a picture or to emphasize certain elements within the picture. A low camera angle is achieved when the camera angle is located below the point of primary interest and pointed upward. Low angles tend to lend strength and dominance to a subject and dramatize the subject. Low angle shots are used when dramatic impact is desired. This type of shot is very useful for separating the subject from the background, for eliminating unwanted foreground and background, and for creating the illusion of greater size and speed (fig. 5-7).

High Viewpoint and High Camera Angle

High viewpoints and high camera angles help orient the viewer, because they show relationships among all elements within the picture area and produce a psychological effect by minimizing the apparent strength or size of the subject (fig. 5-8).

BALANCE

Balance in photographic composition is a matter of making pictures look harmonious. Each element in a picture has a certain amount of value in respect to all the other elements. Every tone, mass, shape, tree, rock figure, building, line, or shadow contributes a certain amount of weight that must be arranged correctly in the composition to give the impression of balance. The subject placement within the picture area is the factor that must be carefully considered.

Composition is kept in balance by two different methods: symmetrical, or formal, balance and asymmetrical, or informal, balance.



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Figure 5-7.—Low viewpoint and low camera angle.

Symmetrical, or Formal, Balance

Symmetrical, or formal, balance in a photograph is achieved when elements on both sides of the picture are of equal weight (fig. 5-9A). The idea of formal balance can be related to a seesaw. When there are two equally

weighted objects on the seesaw and they are equidistant from the pivot point, or fulcrum, the board will be in balance.

Pictures with formal balance may look static and unexciting; however, they do present an air of dignity.

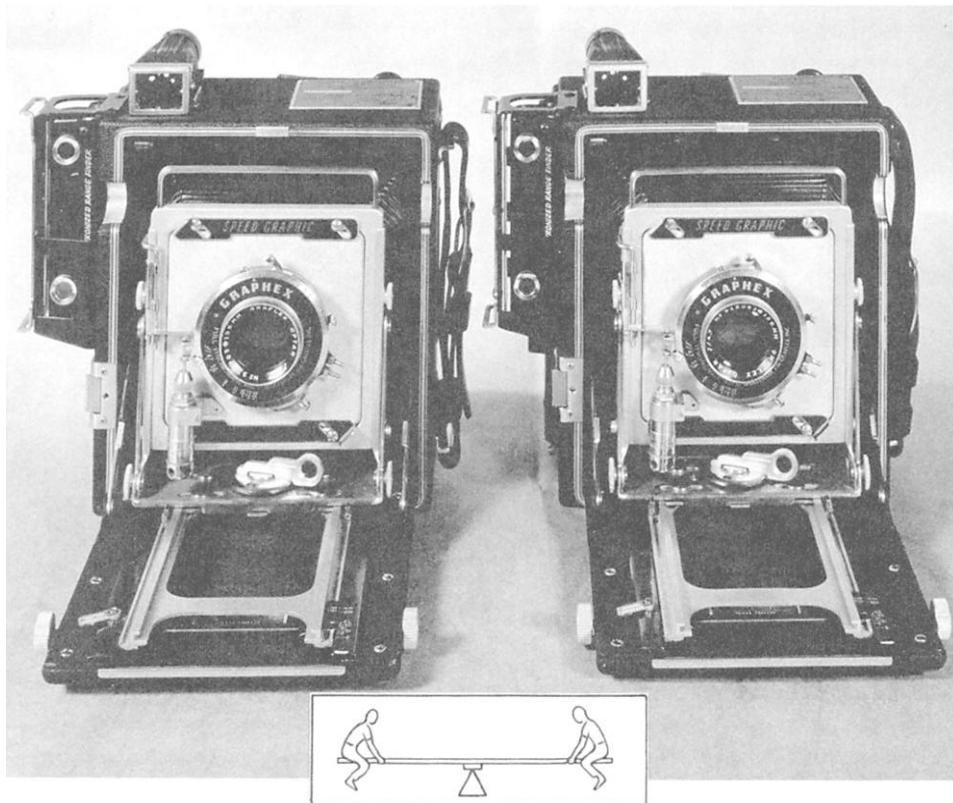


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Figure 5-8.—High viewpoint and high camera angle.

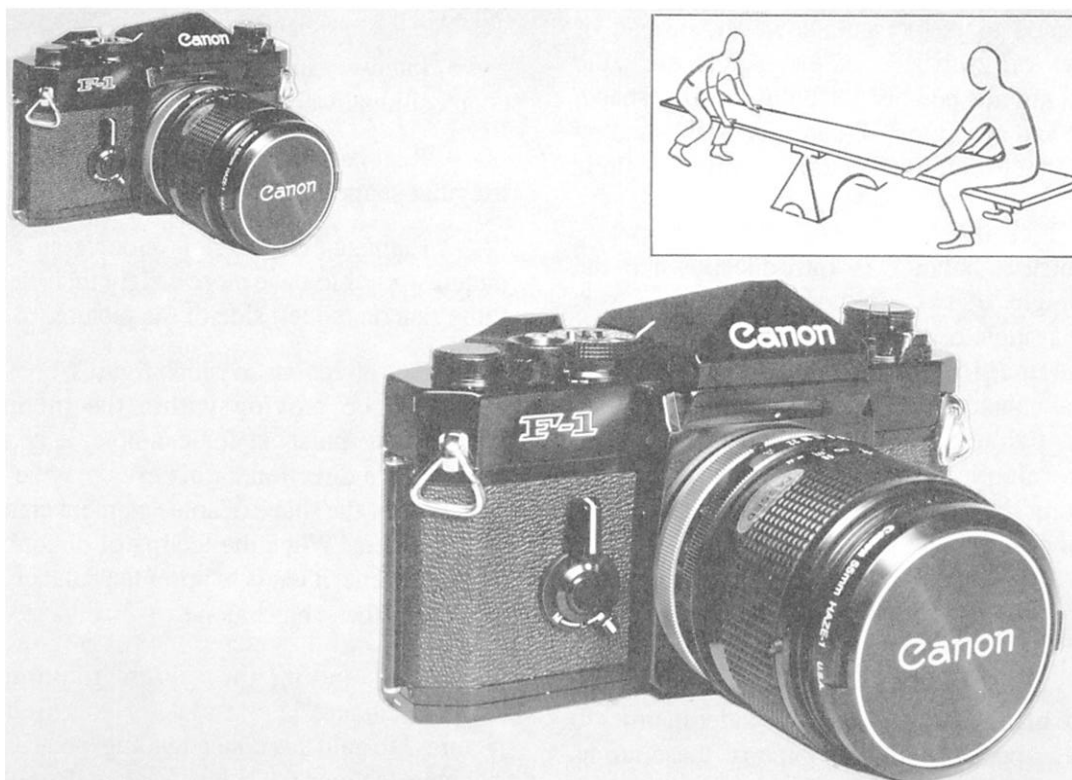
Formal balance does not always mean a picture has to be symmetrical. Symmetrical pictures, in which both sides are exactly the same, are produced only when you want a special effect; therefore, they are not often produced. A variation of symmetrical balance deals with

the seesaw in perspective. The forces or weights are presumed to be approximately equal; but, the imaginary pivot point is set deep into the picture space. With this variation to symmetrical balance, a more interesting photograph is usually created (fig. 5-9B).



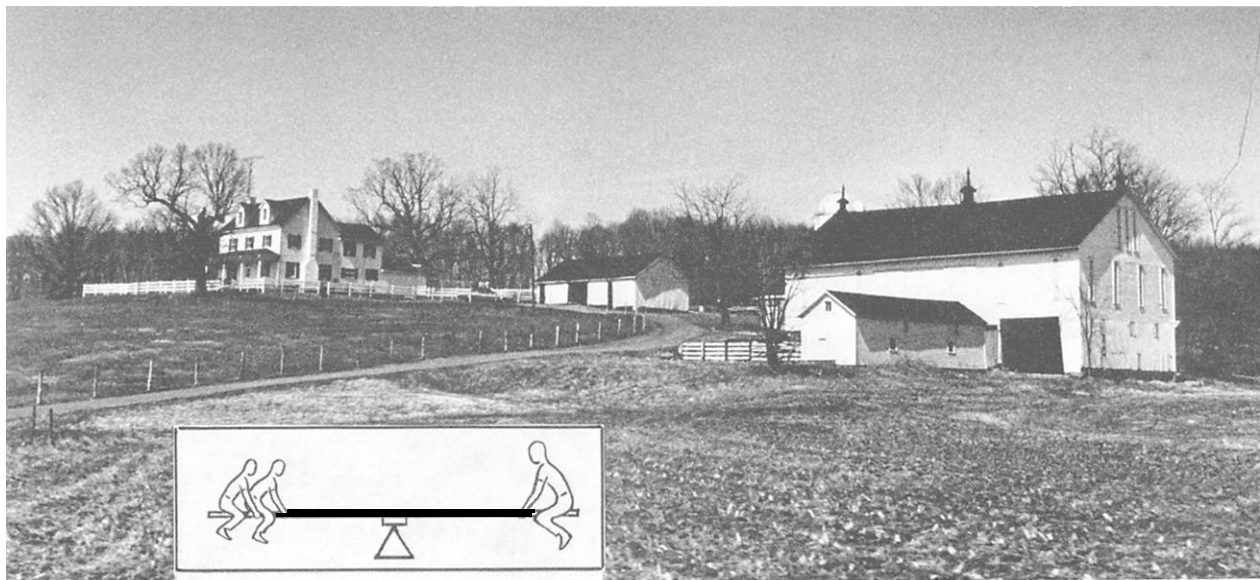
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Figure 5-9A.—Symmetrical, or formal, balance.



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Figure 5-9B.—Symmetrical, or formal, balance.



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Figure 5-10.—Asymmetrical, or Informal, balance.

Asymmetrical, or Informal, Balance

Asymmetrical, or informal, balance is usually much more interesting than symmetrical balance. In asymmetrical balance the imaginary central pivot point is still presumed to be present; however, instead of mirror images on each side of the picture area, the subject elements are notably different in size, shape, weight, tone, and placement. Balance is established by equalizing the element forces in spite of their differences.

Asymmetrical balance is introduced when the presumed weight of two or more lighter objects is equalized by a single heavier object placed on the other side of the imaginary pivot point (fig. 5-10). Asymmetrical balance is more difficult to achieve than symmetrical balance, because of the problem of establishing relative weight values for dissimilar elements within the picture area as well as presenting some form of stability.

Aspects of Balance

There are many other factors to consider in order to make pictures appear balanced. Some of these are as follows:

- An object far from the center of the picture seems to have more weight than one near the center.

- Objects in the upperpart of a picture seem heavier than objects of the same size in the lower part of a picture.

- Isolation seems to increase the weight of an object.

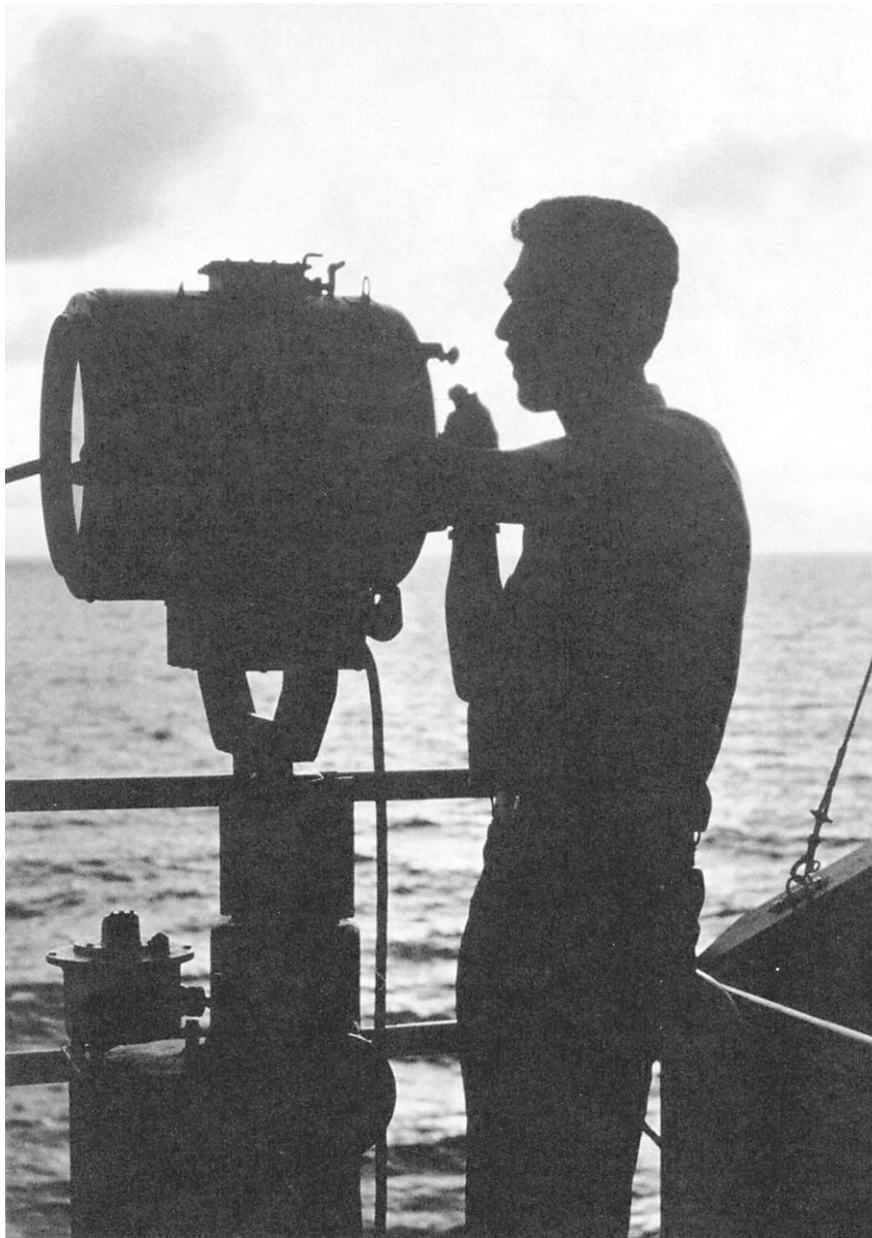
- Intensely interesting objects seem to have more compositional weight.

- Regular shapes seem to have more weight than irregular shapes.

- Elements on the right side of an asymmetrical picture appear to have more weight than elements of the same size on the left side of the picture.

- The directions in which figures, lines, and shapes appear to be moving within the picture area are important to balance; for example, a person may be walking in a direction, or his eyes may be looking in a direction, or the shape of some element creates a feeling of movement. When the feeling of direction is present within a scene, it tends to upset the balance if judged on the size of the subject alone.

Understanding the factors required to create pictorial balance is essential for you to produce good pictures. To gain this understanding, you can continually test your feelings for balance as you look through your camera viewfinder. Once you gain an understanding of the principles of pictorial balance, achieving balance in your photographs becomes an easy process.



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Figure 5-11.—Silhouettes emphasize shape.

SHAPES AND LINES

Shapes and lines are important elements in photographic composition. When properly used, shapes and lines can create a desired effect. As a photographer, you usually have control over the way shapes and lines are used in your pictures.

Shape

Shape is a two-dimensional element basic to picture composition and is usually the first means by which a viewer identifies an object within the picture. *Form* is

the three-dimensional equivalent of shape. Even though shape is only two-dimensional, with the proper application of lighting and tonal range, you can bring out form and give your subjects a three-dimensional quality. Lighting can also subdue or even destroy form by causing dark shadows that may cause several shapes to merge into one.

Shapes can be made more dominant by placing them against plain contrasting backgrounds; for example, consider again the white sail against the dark water background. The greatest emphasis of shape is achieved when the shape is silhouetted (fig. 5-11), thus



PH1 Art Legare
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Figure 5-12.—Leading lines.

eliminating other qualities of the shape, such as texture and roundness, or the illusion of the third dimension.

Lines

Lines can be effective elements of composition, because they give structure to your photographs. Lines can unify composition by directing the viewer's eyes and attention to the main point of the picture or lead the eyes from one part of the picture to another. They can

lead the eyes to infinity, divide the picture, and create patterns. Through linear perspective, lines can lend a sense of depth to a photograph. (Linear perspective causes receding parallel lines to appear to converge in the picture. This allows you to create an illusion of depth in your pictures.)

The viewer's eyes tend to follow lines into the picture (or out of the picture) regardless of whether they are simple linear elements such as fences, roads, and a



PH2(AC) Mark Kettenhofen
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Figure 5-13.—Diagonal lines convey a feeling of dynamic action.

row of phone poles, or more complex line elements, such as curves, shapes, tones, and colors. Lines that lead the eye or direct attention are referred to as *leading lines*. A good leading line is one that starts near the bottom corner of the scene and continues unbroken until it reaches the point of interest (fig. 5-12). It should end at this point; otherwise, attention is carried beyond the primary subject of the photograph. The apparent direction of lines can often be changed by simply changing viewpoint or camera angle.

Vertical, diagonal, horizontal, and curved lines create different moods. Vertical lines communicate a

sense of strength, rigidity, power, and solidarity to the viewer. On the other hand, horizontal lines represent peace, tranquillity, and quietness. A generally accepted practice is to use a vertical format for pictures having predominantly vertical lines and horizontal format for pictures having predominantly horizontal lines. Again, this is a *generally accepted practice*, NOT a rule.

Diagonal lines represent movement, action, and speed. A picture with diagonal lines conveys a feeling of dynamic action even when the subject is static (fig. 5-13). Curved lines present a sense of grace,



PH2 Frazier
302.298

Figure 5-14.—Use of curved lines in photographic composition.

smoothness, and dignity to a photograph (fig. 5-14). The most common curved line is the S curve.

Lines are not only present in the shape of things but can be created by arranging several elements within the picture area so they form lines by their relationship with one another.

PATTERN

Creating your pictures around repeating elements or patterns provides picture unity and structure. Pattern repetition creates rhythm that the eyes enjoy following (fig. 5-15). When lines, shapes, and colors within a picture occur in an orderly way (as in wallpaper), they create patterns that often enhance the attractiveness of photographs. Pattern, like texture, is found almost everywhere. It can be used as the primary subject but is most often used as a subordinate element to enhance composition. When pattern is used as a supporting

element, it must be used carefully so it does not confuse or overwhelm the viewer. Pictures that are purely pattern are seldom used, because they tend to be monotonous. Patterns should be used to strengthen and add interest to your subject.

Shape is the most common and powerful pattern element. Repeated lines, tone, and color can also provide unity to your composition and combinations of these create interesting pictures. Triangles, squares, and circles are the basic shapes to look for in a pattern. Triangles and squares are usually static but can be placed to create a tension-filled, dynamic effect. Circles and curves are pleasing pattern shapes.

VOLUME

When photographing most subjects, you face the problem of how to symbolize three-dimensional objects in a two-dimensional picture. The solution becomes



PHAN A. J. Seely
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Figure 5-15.—Shapes used in composition.

simple when a distinction is made between the two different ways three-dimensional objects appear: as positive, or occupied space (volume) or as negative, or unoccupied space.

If you make a picture to show the entire machine shop aboard a repair ship using only one powerful flash

unit placed at the camera, you only *symbolize* empty or negative space; however, a sense of depth is provided because of increasing darkness toward the back of the shop. Occupied or positive space (the machines) is front-lighted and appears shadowless and flat. On the other hand, if you use a series of lights along the sides

of the machine shop to sidelight the machines, shadows are cast at their sides and occupied or positive space appears three-dimensional; however, since all the machines, both near and far, are now lighted the same, you do not create a sense of depth, and empty or negative space appears flat. For the best picture of the machine shop, you should light the machines in a way that the three-dimensional form is represented, while creating a sense of depth by reducing the intensity of illumination toward the back of the shop.

LIGHTING

Lighting is also an important creative element of composition. By controlling the light and directing it where you want it, you can subdue objects or distracting elements in the scene to give more emphasis to the main point of interest.

For good picture composition, you must develop an awareness of how changes in lighting can affect the appearance of things around you. Light and shadows can be used in composition to create mood, to draw attention to an area, to modify or distort shape, or to bring out form and texture in the subject.

Shadows are a key to apparent form in photographs. Without shadows, the subject records without form, curvature, or texture, appearing flat and lifeless. This does not mean that shadows must be harsh and black to achieve the effects of form, curvature, and texture. They may be soft, yet of sufficient density to show the most delicate roundness and form. Generally, harsh, black shadows are undesirable in a photograph due to the loss of detail in them. From a compositional standpoint, black shadows can be very useful in balancing a scene and directing attention to the point of interest. Harsh shadows can also be excellent for emphasizing texture and form, for creating interesting patterns, and for directing attention to the main point of interest; however, the same elements can also obscure detail and reduce form. When the lighting is harsh, such as on a clear, sunny day, shadows have sharply defined edges and are probably very dark, sometimes to the point that they appear stronger than the primary subject and attract attention to themselves.

TEXTURE

Texture helps to emphasize the features and details in a photograph. By capturing “texture” of objects being photographed, you can create form.

When people observe a soft, furry object or a smooth, shining surface, they have a strong urge to touch it. You can provide much of the pleasure people get from the feel of touching such objects by rendering texture in your pictures. Texture can be used to give realism and character to a picture and may in itself be the subject of a photograph. When texture is used as a subordinate element within the picture, it lends strength to the main idea in the photograph. It usually takes just a little different lighting or a slight change in camera position to improve the rendering of texture in a picture. When an area in a photograph shows rich texture, the textured area usually creates a form or shape; therefore, it should be considered in planning the photograph (fig. 5-16).

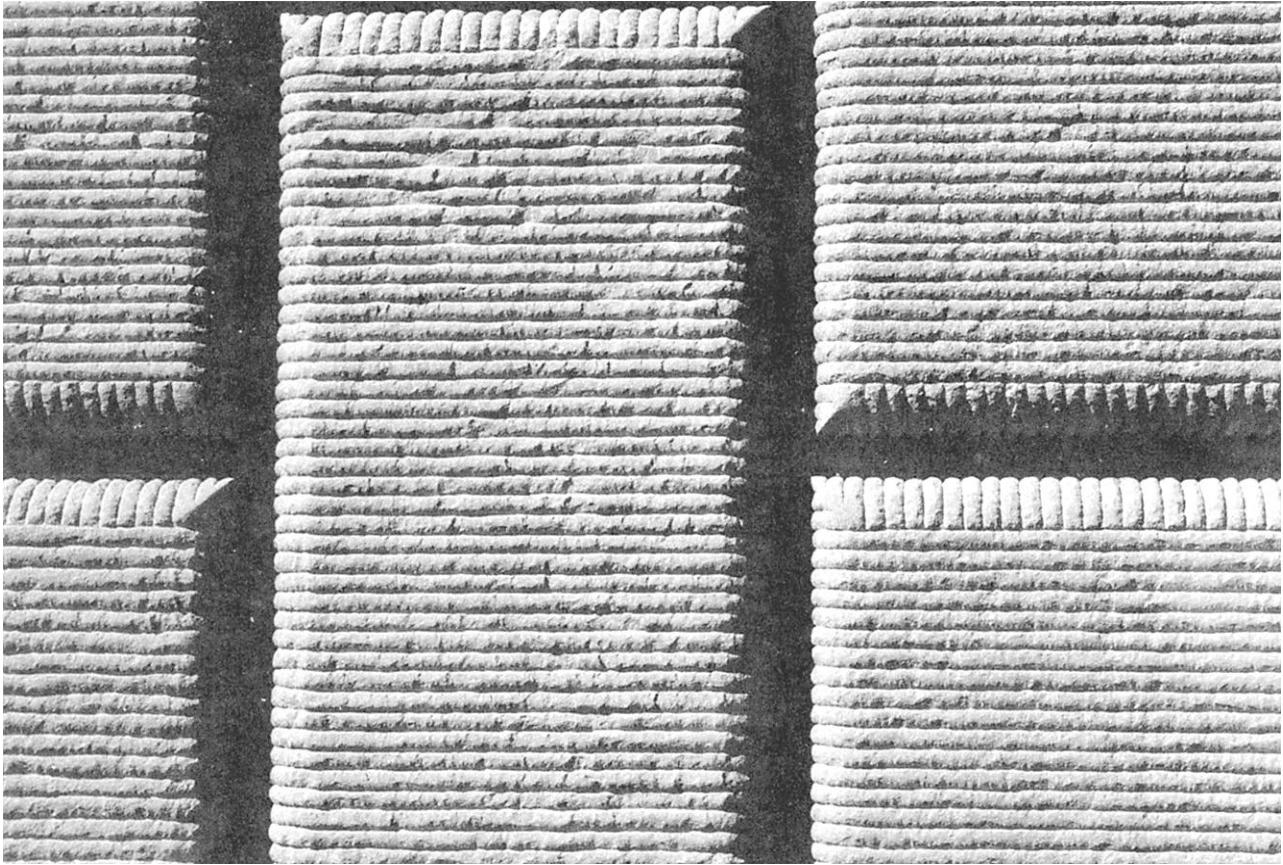
tone

Tone is probably the most intangible element of composition. Tone may consist of shadings from white-to-gray-to-black, or it may consist of darks against lights with little or no grays. The use of dark areas against light areas is a common method of adding the feeling of a third dimension to a two-dimensional black-and-white picture. The interaction of light against dark shades in varying degrees helps to set the mood of a composition. A picture consisting of dark or somber shades conveys mystery, intrigue, or sadness. When the tones are mostly light and airy, the picture portrays lightness, joy, or airiness.

CONTRAST

Contrast in photographic composition is an effective means of directing the viewer's attention to the center of interest. Positioning of subject elements to create contrast gives them added emphasis and directs the viewer's attention.

When we speak of contrast as it relates to composition, we are referring to both tonal contrast, as in black-and-white photography, and color contrast as it relates to color photography. In black-and-white photography, contrast is the difference in subject tones from white-to-gray-to-black or from the lightest tone to the darkest tone. In color photography different colors create contrast.



PH2 J. Finnigan
302.300

Figure 5-16.-Photograph emphasizing texture.

Tonal Contrast

In black-and-white photography, contrast is considered either *high*, *normal*, or *low*. A high-contrast scene or photograph consists primarily of white and black with few or no middle gray tones. A black sailor in a white uniform against a light background is an example of a high-contrast (contrasty) scene. Most scenes you photograph have normal contrast. There will probably be elements within the scene that are very light or white, some that are very dark or black, and many tones or colors that reproduce as various tones of gray. A low-contrast (flat) scene has colors or tones in which highlights and shadows have very little difference in densities. In other words, all colors or tones within the scene are very similar in appearance. A white sailor in a white uniform against a light background is an example of a scene with low contrast.

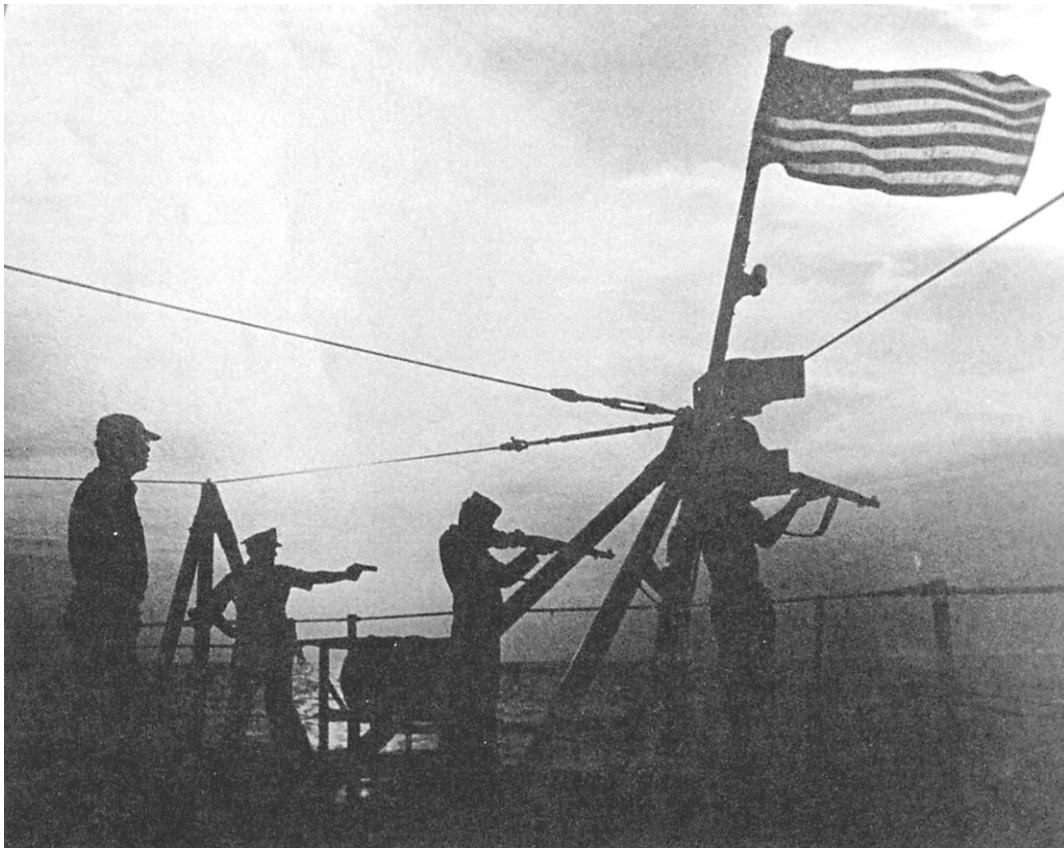
In black-and-white photography, high contrast conveys a sense of hardness and is characteristic of

strength and power. Low contrast conveys a sense of softness and is characteristic of gentleness and mildness.

Color Contrast

Color contrast is an effective compositional element in color photography, just as tone is in black-and-white photography. Colors with opposite characteristics contrast strongly when placed together. Each color accentuates the qualities of the other and makes the color images stand out dramatically. Color contrast is enhanced when you create the contrast of detail against mass. An example is a single, bright, red flower in a clear, glass vase photographed against a bright, green background.

Cold colors (bluish) and warm colors (reddish) almost always contrast. Cold colors recede, while warm colors advance. Light colors contrast against dark ones, and a bold color offsets a weak color.



PH2 Neil Crews
302.301

Figure 5-17.—Low-key scene.

LOW- AND HIGH-KEY SCENES.—When a scene contains mostly dark tones or colors, it is low key (fig. 5-17). When the scene contains mostly light tones, it is high key (5-18). Low-key and high-key pictures convey mood and atmosphere. Low key often suggests seriousness and mystery and is often used in horror pictures, such as a dark-granite castle in a thunderstorm. High key creates a feeling of delicacy and lightness. A photograph of a fair-skinned, blond-haired mother dressed in a white gown against a light background nursing her baby is a good subject for a high-key picture.

HIGH- AND LOW-KEY COLORS.—High-key color pictures contain large areas of light desaturated colors (pastels) with very few middle colors or shadows. Intentionally overexposing color film (exposing for the shadows) helps to create a high-key effect.

A low-key effect is created when the scene is dominated by shadows and weak lighting. Low-key pictures tend to have large areas of shadow, few highlights, and degraded colors. Naturally dark subjects are best for low-key pictures. Low-key color pictures can be induced by exposing color film for the highlights.

FRAMING

Framing is another technique photographers use to direct the viewer's attention to the primary subject of a picture. Positioned around the subject, a tree, an archway, or even people, for example, can create a frame within the picture area. Subjects enclosed by a frame become separated from the rest of the picture and are emphasized. Looking across a broad expanse of land or water at some object can make a rather dull uninteresting view. Moving back a few feet and framing the object between trees improves the composition.

An element used as a frame should not draw attention to itself. Ideally, the frame should relate to the theme of the picture; for example, a line of aircraft parked on the flight line framed by the wing and prop of another aircraft.

Not only is framing an effective means of directing the viewer's attention, it can also be used to obscure undesirable foregrounds and backgrounds. The illusion of depth can be created in a picture by the effective use of framing (fig. 5-19).



JOC Guy Miller
302.52

Figure 5-18.—High-key scene.



PH1 Michael D.P. Flynn
302.302

Figure 5-19.—Framing used in photographic composition.



PH3 Tim O'Neill
302.95

Figure 5-20.—Blurred background creates subject separation.

FOREGROUND

A large percentage of otherwise good pictures is ruined, because they include unnecessary or distracting foreground. This common fault can result from the photographer standing too far away from their subject when they *take* a picture, or the fact that normal focal length or standard lenses cover a relatively wide angle of view.

Undesirable foreground can be eliminated by moving in closer to the subject, by making pictures with a longer than standard focal-length lens, or by changing viewpoint or camera angle. Many already existing pictures can be improved by enlarging only a section of the negative and by cropping out meaningless or distracting foreground. In most cases, the foreground should be sharply focused and of sufficient depth to furnish substantial support for the subject. No object in the foreground should ever be so prominent that it distracts from the subject. You should clear the foreground of items that have no connection with the

picture. The ultimate example of carelessness on the part of the photographer is to leave his or her camera case where it shows in the picture. Generally, the foreground contains the leading line that is the line that leads the eye into the photograph and toward the point of interest. Whether this line is an object or series of objects or shadows, it should be sharply focused. A fuzzy, out-of-focus foreground usually irritates the senses and detracts from emphasis on the subject matter.

BACKGROUND

The background is almost as important an element in good composition as the camera angle. Too often it is overlooked when composing a scene since the photographer normally gives so much attention to the subject. Be particularly observant of the background to see that it contains nothing distracting. A tree or pole that was unnoticed in the distance behind a person when composing the scene may appear in the photograph to

be growing out of his or her collar or supporting his or her head.

The background should be subordinate to the main subject in both tone and interest. It should also make the subject stand out and present it to best advantage. Unsharpness and blur are effective ways for separating the subject from the background. Unsharpness can be accomplished by using a relatively large f/stop to render the background out of focus. In the case of subjects in motion, the subject can be pictured sharply and the background blurred by panning the subject (fig. 5-20). Occasionally, you may want to reverse these effects and record the subject unsharp or blurred and the background sharp. This is done to create the impression of the subject being closer to the viewer or to express motion by holding the camera still as you use a shutter speed that is too slow to “stop” the motion.

PERSPECTIVE

Perspective refers to the relationship of imaged objects in a photograph. This includes their relative positions and sizes and the space between them. In other words, perspective in the composition of a photograph is the way real three-dimensional objects are pictured in a photograph that has a two-dimensional plane. In photography, perspective is another illusion you use to produce photographs of quality composition.

When you are making pictures, the camera always creates perspective. Because a camera automatically produces perspective, many novice photographers believe there is no need to know much about it. This attitude is far from correct. When you know the principles of perspective and skillfully apply them, the photographs you produce show a good rendition of the subject's form and shape, and the viewer is given the sensation of volume, space, depth, and distance. Additionally, the photographer can manipulate perspective to change the illusion of space and distance by either expanding or compressing these factors, therefore providing a sense of scale within the picture.

Linear Perspective

The human eye judges distance by the way elements within a scene diminish in size, and the angle at which lines and planes converge. This is called *linear perspective*.

The distance between camera and subject and the lens focal length are critical factors affecting linear perspective. This perspective changes as the camera position or viewpoint changes. From a given position,

changing only the lens focal length, and not the camera position, does not change the *actual* viewpoint, but may change the *apparent* viewpoint.

The use of different focal-length lenses in combination with different lens-to-subject distances helps you alter linear perspective in your pictures. When the focal length of the lens is changed but the lens-to-subject distance remains unchanged, there is a change in the image size of the objects, but no change in perspective. On the other hand, when the lens-to-subject distance and lens focal length are both changed, the relationship between objects is altered and perspective is changed. By using the right combination of camera-to-subject distance and lens focal length, a photographer can create a picture that looks deep or shallow. This feeling of depth or shallowness is only an illusion, but it is an important compositional factor.

Using a short-focal-length lens from a close camera-to-subject distance, or viewpoint, produces a picture with greater depth (not to be confused with depth of field) than would be produced with a standard lens. Conversely, using a long-focal-length lens from a more distant viewpoint produces a picture with less apparent depth.

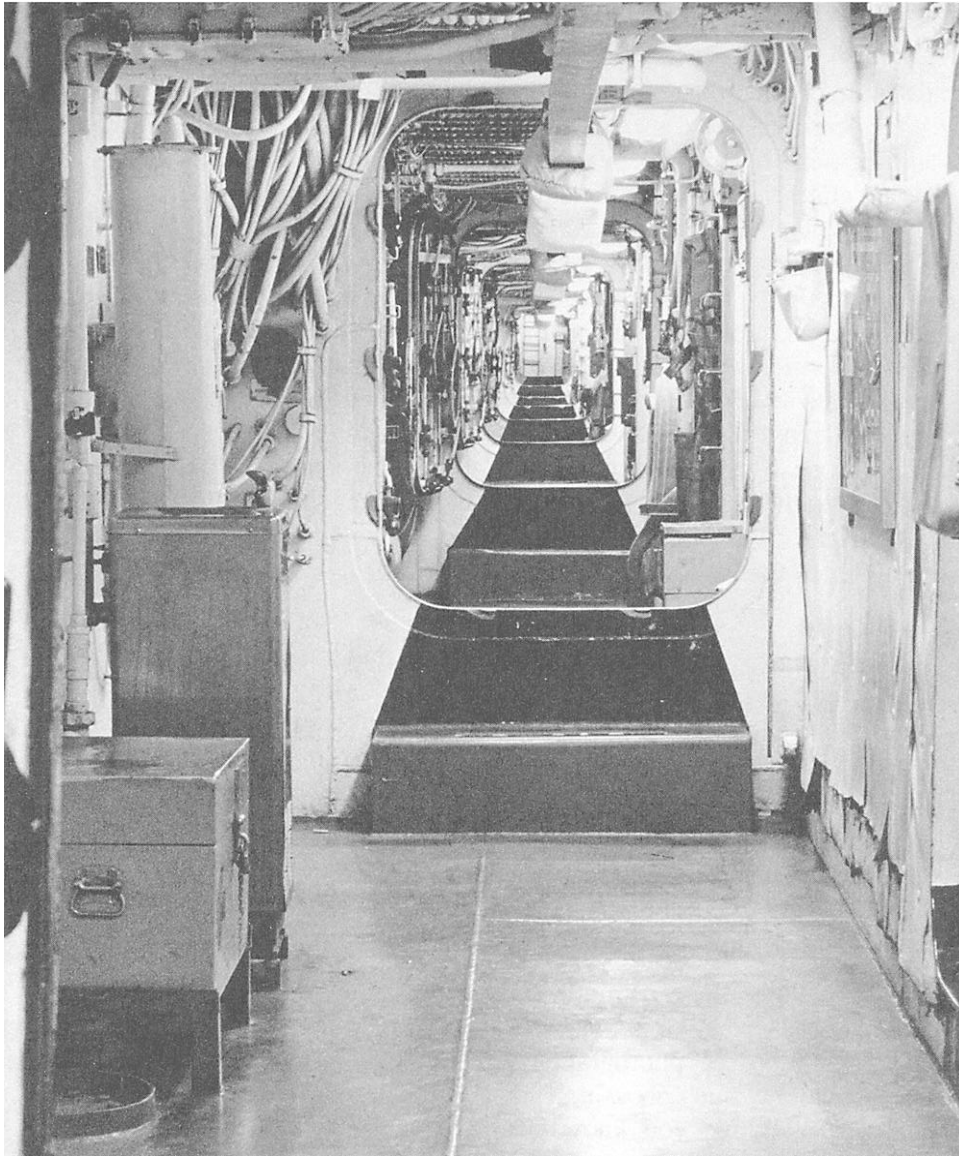
Rectilinear Perspective

Most lenses produce rectilinear perspective that are typical of what the human eye sees. This is to say that lines that are straight in the subject are reproduced straight in the picture. Most pictures are made with rectilinear lenses.

Fisheye lenses and the lenses used on panoramic cameras produce a false perspective. A panoramic lens produces panoramic or cylindrical perspective. In other words, all straight horizontal lines at the lens axis level are recorded as straight lines, and all other straight horizontal lines either above or below the lens axis level are reproduced as curved lines. The other false perspective is produced by a fisheye lens in which all straight lines in the subject are imaged as curved lines toward the edges of the picture.

Vanishing Point Perspective

In vision, lines that are parallel to each other give the sensation of meeting at vanishing points. When parallel lines, either horizontal or vertical, are *perpendicular* to the lens axis, the vanishing points are assumed to be at infinity. Other lines, those which are *parallel* to the lens axis, and all other parallel lines at all other angles to the lens axis meet at definable vanishing



PHC Jeff Hilton
302.303

Figure 5-21.—Vanishing point perspective.

points. Thus lines that are parallel to the lens axis, or nearly parallel, start in the front of the picture and meet at vanishing points within the picture or at finite points outside the picture (fig. 5-21).

Height Perspective

The place where the base of an object is located on the ground in a picture is a clue to its distance from the camera viewpoint; for example, in a landscape scene, the ground or ground plane rises toward the horizon. The higher up in the ground area of the picture (up to the horizon) that the base of an object is located, the further

away it seems from the viewpoint and the greater its height perspective.

Overlap Perspective

Another clue to distance in a photograph is overlap perspective. When subjects within the picture are on about the same line of sight, those objects closer to the camera viewpoint overlap more distant objects and partially hide them. It is obvious to the viewer that the partially obstructed object is behind the unobstructed object. This overlap is repeated many times within the picture and gives the viewer a sense of depth and a perception of the relative distance of objects.



PH3 Joan Zopf
302.304

Figure 5-22.—Dwindling size perspective.

Dwindling Size Perspective

Through the experience of vision, you are aware of the size of many common objects, such as people, trees, cars, buildings, and animals; for example, you are aware that most adults are about 5 to 6 feet tall; therefore, when two people are shown in a picture and one appears twice as tall as the other, you cannot assume that one is in reality taller than the other. Instead you assume the taller person is closer and the shorter person farther away from the camera viewpoint. In this same manner, you make a size relationship evaluation of all familiar objects. Thus you can make a distance determination from this size relationship evaluation. The farther away an object is from the viewpoint, the smaller it appears; therefore, when subjects of familiar size are included in a photograph, they help to establish the scale of the picture (fig. 5-22). Scale helps the viewer determine or visualize

the actual size or relative size of the objects in the picture.

Volume Perspective

When a subject is lighted with very diffused light, the three-dimensional form or volume of the subject is difficult to perceive because of the lack of distinct shadows. If, on the other hand, subjects are lighted with strong directional light from angles that cause part of the subject to be fully lighted and other parts to be in shadow, a visual clue of the subject's form or volume is provided. When a number of such objects are included within the picture area, the perception of form, volume, and depth is increased. When front or side lighting is used, the length, depth, and shape of the shadows cast on the ground provide a perspective of each object's volume. Also, the distance between shadows cast on the



302.305

Figure 5-23.—Atmospheric perspective.

ground helps you to perceive the overall depth of the scene.

Atmospheric Perspective

For all practical purposes, air is transparent. For most photography, this is fundamentally true; however, when pictures are made of subjects at great distances, the air is actually less than fully transparent. This is because air contains very fine particles of water vapor, dust, smoke, and so on. These particles scatter light and change its direction. The presence of scattering shows distant subjects in pictures as having a veil or haze. The appearance or effect of this scattering is proportional to the distance of the objects from the viewpoint. The greater the distance, the greater the amount of veiling or haze (fig. 5-23). The effects of this scattering of light are additive, but vary with atmospheric conditions.

In atmospheric perspective several factors must be considered:

- **Contrast**—The luminance of each object in a scene is a direct result of the objects reflective quality and the amount of light falling on it. When objects are far away, light from highly reflective objects is scattered; therefore, when viewed from a distance (or imaged on a print), the darker portions of these distant objects do not appear as dark and the contrast is reduced. When there are objects both near and far from the camera, the difference in contrast provides a perception of distance.
- **Brightness**—The particles in air that scatter light are also illuminated by the sun. This causes an increase in the overall brightness of the objects seen. This increase in luminance, coupled with a loss of contrast, causes objects in the distance to be seen and

photographed as lighter in color than they would be at a closer distance.

- **Color saturation**—The scattering of light not only affects contrast and brightness but also color saturation.

Color is defined by three qualities: *hue* (the actual wavelength), *saturation* (intensity or chroma), and *brightness* (reflective). A pure hue is fully saturated or undiluted. When a hue is desaturated or diluted, it is no longer pure but has gray intermingled with it. The actual colors of a distant scene appear to have less color saturation, because the light is scattered and also because of the overall presence of the desaturated (diluted) blue light of aerial haze. The original scene colors appear less saturated or pure when seen or photographed from a distance than from close-up; therefore, color saturation or desaturation allows the viewer to perceive distance in a color photograph.

- **Sharpness**—Because of atmospheric haze, there is a loss of image sharpness or definition in distant objects. This loss of sharpness is caused both by the lowering of contrast and the scattering of light. The loss of sharpness contributes to a sense of distance. This can be enhanced by setting the far limit of the lens depth of field just short of infinity. This procedure throws the most distant objects slightly out of focus. This combined with the other effects of aerial perspective intensifies the sense of distance.

PHOTOGRAPHIC LIGHTING

In this discussion of lighting, the basic lighting techniques used by photographers are presented. Lighting used primarily with a certain segment of photography, such as motion picture, TV, portrait, and studio, are discussed in the chapters relevant to that particular subject.

OUTDOOR LIGHTING

As a photographer, you work with light to produce quality pictures. The color, direction, quantity, and quality of the light you use determines how your subjects appear. In the studio, with artificial light sources, you can precisely control these four effects; however, most of the pictures you make are taken outdoors. Daylight and sunlight are not a constant source, because they change hourly and with the weather, season, location, and latitude. This changing daylight can alter the apparent shapes, colors, tones, and forms of a scene. The color of sunlight changes most

rapidly at the extreme ends of the day. Strong color changes also occur during storms, haze, or mist and on blue wintery days. The direction of light changes as the sun moves across the sky. The shape and direction of shadows are altered, and the different directions of sunlight greatly affect the appearance of a scene.

The quality of sunlight depends on its strength and direction. Strong, direct sunlight is “hard” because it produces dark, well-defined shadows and brilliant highlights, with strong modeling of form. Sunlight is hardest on clear summer days at noon. Strong sunlight makes strong colors more brilliant, but weak colors pale. Sunlight is diffused by haze, mist, and pollution in the air. This diffused or reflected light is softer; it produces weak, soft shadows and dull highlights. Directionless, diffused sunlight is often called “flat” lighting because it produces fine detail but subdues or flattens form. Weak, directionless sunlight provides vibrant, well-saturated colors.

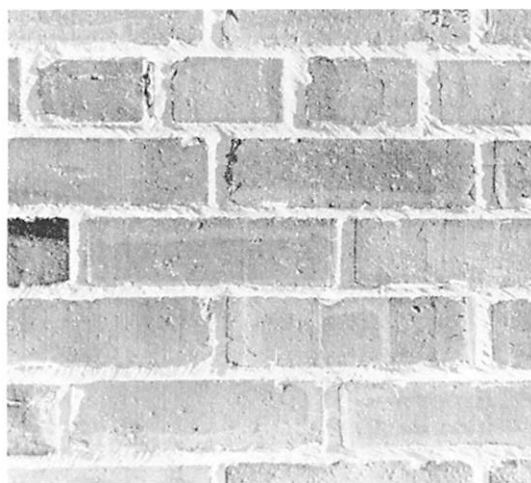
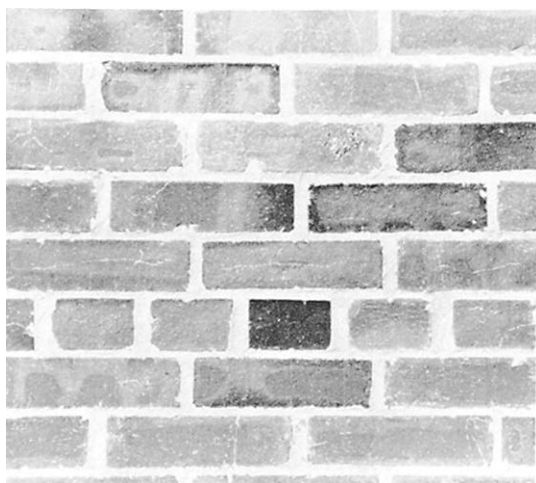
Frontlighting

The old adage about keeping the sun at your back is a good place to continue our discussion of outdoor lighting. The type of lighting created when the sun is in back of the photographer is called frontlighting. This over-the-shoulder lighting was probably the first photographic advice you ever received. This may seem to be a universal recipe for good photography. But it is not. The case against over-the-shoulder lighting is it produces a flattened effect, doing nothing to bring out detail or provide an impression of depth. The human eye sees in three dimensions and can compensate for poor lighting. A photograph is only two-dimensional; therefore, to give an impression of form, depth, and texture to the subject, you should ideally have the light come from the side or at least at an angle.

Side Lighting

As you gain experience with various types of outdoor lighting, you discover that interesting effects can be achieved by changing the angle of the light falling on your subject. As you turn your subject, change the camera viewpoint, or wait for the sun to move, the light falls more on one side, and more shadows are cast on the opposite side of the subject. For pictures in which rendering texture is important, side lighting is ideal.

Look at a brick wall, first in direct front sunlight and then in side lighting. Direct, front sunlight shows the pattern of the bricks and mortar in a flat, uninformative



PHC Ron Bayles
302.88

Figures 5-24.—Comparison of front and side lighting.

way, but side lighting creates shadows in every little crevice (fig. 5-24). The effect increases as the light is more parallel with the wall until long shadows fall from the smallest irregularity in the brickwork. This can give an almost 3-D effect to a photograph.

Side lighting is particularly important with black-and-white photography that relies on gray tones, rather than color, to record the subject. Shadows caused by side lighting reveal details that can create striking pictures from ordinary objects that are otherwise hardly worth photographing in black and white. Anything that has a noticeable texture—like the ripples of sand on a beach, for example—gains impact when lit from the side. Landscapes, buildings, people, all look better when sidelighted.

This applies to color photography as well. Color gives the viewer extra information about the subject that may make up for a lack of texture in frontlighting, but often the result is much better when lit from the side.

Pictures made with side lighting usually have harsh shadows and are contrasty. To lighten the shadows and reduce the contrast, you may want to use some type of reflector to direct additional skylight into the shadow areas or use fill-in flash, whichever is more convenient.

Backlighting

When the sun is in front of the photographer, coming directly at the camera, you have what is referred to as backlighting; that is, the *subject* is backlit. This type of lighting can be very effective for pictures of people outdoors in bright sunlight. In bright sunlight, when

subjects are front-lighted or even sidelighted, they may be uncomfortable and squint their eyes. Backlighting helps to eliminate this problem. Backlighting may also require the use of a reflector or fill-in flash to brighten up the dark shadows and improve subject detail. Backlighting is also used to produce a silhouette effect.

When you use backlighting, avoid having the sun rays fall directly on the lens (except for special effects). A lens hood or some other means of shading the lens should be used to prevent lens flare.

EXISTING LIGHT

Existing light photography, sometimes called available or natural light photography, is the making of pictures by the light that happens to be on the scene. This includes light from table, floor, and ceiling lights, neon signs, windows, skylights, candles, fireplaces, auto mobile headlights, and any other type of light that provides the natural lighting of a scene—except daylight outdoors. (Moonlight is considered existing light.) Existing light then is that type of light found in the home, in the office, in the hangar bay, in the chapel, in the club, in the sports arenas, and so on. Outdoor scenes at twilight or after dark are also existing light situations.

Photography by existing light produces pictures that look natural. Even the most skillfully lighted flash picture may look artificial when compared to a good existing light photograph. With existing light photography, the photographer has an opportunity to make dramatic, creative pictures. Existing light allows the photographer greater freedom of movement because

extra lighting equipment is not required. Subject distance, when not using flash, has no effect on exposure; therefore, you can easily photograph distant subjects that could not otherwise be photographed using flash or some other means of auxiliary lighting. With existing light, you can make pictures that could not be taken with other types of lighting; for example, flash may not be appropriate during a change of command ceremony or chapel service. Not only can the flash disturb the proceedings, but it may not carry far enough to light the subject adequately.

For existing light pictures, your camera should be equipped with a fast lens—at least $f/2.8$, but preferably about $f/1.4$. The camera shutter should have a B or T setting, and for exposures longer than about $1/60$ second, you need a tripod or other means of supporting the camera.

Because the level of illumination for many existing light scenes is quite low, you may want to consider using a high-speed film. When making pictures with plenty of existing light or when you particularly want long exposures for special effect, you can use a slower film; however, the advantages of high-speed film are as follows:

- Allows you to get adequate exposure for hand-held shots.
- Allows you to use faster shutter speeds to reduce camera and image motion.
- Permits the use of longer focal-length lenses when the camera is hand-held.
- Allows the use of smaller f /stops for greater depth of field.

When you are making existing-light color pictures indoors of scenes illuminated by tungsten light, use a tungsten type of film. When the light for your indoor color pictures is daylight from a window or skylight, use a daylight type of color film or use tungsten film with a No. 85B filter. Always use an exposure meter to calculate your indoor existing light exposure. When a bright window is included in the background, take a closeup meter reading of the subject to prevent the meter from being overly influenced by light from the window.

Pictures made indoors by existing daylight are pleasing to the viewer, because of the soft diffused light and the squint-free expression of your subjects. Open all the window drapes in the room to get the highest level of illumination possible. Pose your subject to allow diffused daylight to fall on the front or side of their face.

Try not to pose your subject in a position where too much of the facial features are in shadow, unless you are trying for a special effect, such as a silhouette. When you photograph your subject in direct nondiffused sunlight coming through a window, you have more light to work with, but the light is contrasty and your subject has a tendency to squint.

Indoor existing light, artificial or otherwise, may be quite contrasty; for example, when your subjects are close to the source of light and well-illuminated, while other areas of the scene are comparatively dark. By turning on all the lights in the room, you can make the illumination more even and provide additional light for exposure and at the same time reduce the scene contrast. The contrast created by some artificial lighting can also be reduced in an average size room by bouncing auxiliary light off the ceiling or by using reflectors. Adding auxiliary bounce lighting or reflectors means you are not making true existing light pictures, but this extra light helps to reduce contrast without spoiling the natural appearance of the scene.

Fluorescent Lighting

Indoor scenes illuminated by fluorescent lights usually appear pleasing and natural in real life; however, color pictures of these same scenes often have an overall color cast that makes them appear unnatural. Fluorescent light emits blue and green light primarily and is deficient in red light. Most color pictures made without a filter under fluorescent light are also deficient in red and have an overall greenish appearance. Used correctly, fluorescent light has some advantages over other types of available light. A room illuminated by fluorescent lamps is usually brighter and more evenly lighted than a room illuminated by tungsten lamps. This higher level of light makes it easier to get enough exposure for your existing light photography and helps record detail that may have been lost in the shadow areas with other types of existing light. When photographing people, however, fluorescent lighting often causes dark shadows under the subject's eyes. These shadows cause the eyes to appear dark and sunk in.

For making color pictures under fluorescent lighting, a negative color film with the appropriate filter is most often your best bet. Color negative film has a wide exposure latitude that permits, to some extent, a variation in exposure without detracting from the quality of the finished print. The greenish effect caused by fluorescent lighting can be partially corrected when the color negatives are printed.

For color slides with fluorescent light, a daylight type of film with the appropriate filter is best. Tungsten film usually produces slides with too much blue or green when made with fluorescent light.

As discussed in chapter 3, the use of filters for color photography helps to overcome the deficiency of red light in fluorescent lamps. Always consult the *Photo-Lab Index* for the best film filter combinations to use.

Pictures Outdoors at Night

Outdoor night scenes usually include large areas of darkness broken by smaller areas of light from buildings, signs, and streetlights. Pictures of outdoor scenes are quite easy to make because good results are obtainable over a wide range of exposures. Using short exposures emphasizes well-lit areas by preserving the highlight detail, while the shadow areas are dark because of underexposure. Long exposures help retain the detail of the dark areas, while highlight detail is lost because of overexposure.

Large, dark areas in night scenes make it difficult to make accurate exposure meter readings from your camera position. The best meter reading results are obtained when you take closeup readings of important scene areas.

Color outdoor pictures at night can be made on either daylight or tungsten-type films. Pictures made on daylight film have a warm, yellow-red appearance. Those made on tungsten film have a colder more natural look; however, both films provide pleasing results, so it is a matter of personal preference which you use.

A good time to make outdoor night color pictures is just before it gets completely dark. At this time, some rich blue (or even orange) is in the sky. This deep color at dusk gives a dramatic background to your pictures. Neon signs, streetlights, and building lights make bright subjects for your pictures. At night, right after it stops raining and everything is still wet, is another good time to make outdoor pictures. The lights in the scene produce many colorful reflections on the wet pavement, adding interest to what may otherwise be a lifeless, dull picture.

Many buildings look rather ordinary in daylight, but at night, they are often interestingly lighted. Try photographing the hangar at night, with the lights on and the hangar doors open. Also, your ship at night, especially a rainy night may make a very striking picture.

Outdoor events that take place at night in a sports stadium are usually well-lighted and make excellent subjects for existing light pictures. Most sports stadiums

(as well as streets) are illuminated by mercury-vapor lamps that look blue-green in color when compared to tungsten lamps. Your best color pictures made under mercury-vapor lighting will be shot on daylight color film, although they will appear bluish green because the lights are deficient in red.

Tips for existing light photography are as follows:

- Carry a flashlight so you can see to make camera settings.
- If you do not have an exposure meter or cannot get a good reading, bracket your exposure.
- Focus carefully; depth of field is shallow at the wide apertures required for existing light photography.
- When you have a scene illuminated by a combination of light sources, use the type of color film recommended for the predominant light source.
- For pictures of fireworks, support your camera on a tripod, focus at infinity, and aim the camera toward the sky area where the display will take place. Open the shutter for several bursts.

ELECTRONIC FLASH LIGHTING

In situations where there is little or no light available, a portable electronic flash unit is an invaluable piece of photographic equipment. With fast films and long exposures, you may be able to shoot existing light pictures, providing your subject remains still long enough. Although you can certainly get better lighting control with elaborate photographic lights, the simplicity and portability of electronic flash is unbeatable.

Electronic flash provides an excellent source of artificial light for exposing black-and-white and color daylight-balanced film. Light from an electronic flash unit (strobe) is characterized by softness, short duration, and color balance, approximating that of daylight.

By measuring the amount of light that actually reaches an object or scene, you can obtain a numerical value that can be converted directly into a flash guide number. The numerical value is the light output rating of an electronic flash unit measured in beam candlepower-seconds (BCPS) or more correctly, effective candlepower-seconds (ECPS).

Every electronic flash unit is assigned a guide number as a measure of its light output or power. The higher the guide number, the greater the light output. Guide numbers for various film speeds are usually

provided with each electronic flash unit. Information packaged with film may also provide guide numbers appropriate to their speed in regard to the various powers of electronic flash units. Manufacturers tend to overrate the power of their electronic flash units. When guide numbers are assigned by the manufacturer, they base the guide number on an average reflective subject and in a room with 10-foot light-colored ceilings. By using these methods, the manufacturers are able to take advantage of the films exposure latitude.

Like exposure meters, guide numbers are not infallible and some variation from assigned values should be expected. To ensure accuracy of the flash unit, you must check the efficiency of your electronic flash unit to determine your own reliable guide numbers. The steps used to check efficiency are as follows:

1. Place your flash unit (on the camera) exactly 10 feet from a live model who is holding a series of cards—one for each f/stop marked on your lens.

2. Load the camera with the type of film you want to test.

3. Focus the camera on the model and make an exposure at each of the f/stops marked on the cards.

For each exposure, instruct the model to hold up the card marked with the f/stop to be used so it shows noticeably in the picture. Process your film normally, examine the proof sheet or slides carefully, and choose the one shot that best reproduces the model's skin tones. Multiply the f/stop on the card in that picture by 10 (the flash-to-subject distance) and you have the guide number for that particular film and flash unit combination. If, for example, the best exposure was made at f/8, the guide number is 80 ($8 \times 10 = 80$). Once you have determined the correct guide numbers for use with various films, make up a reference chart and attach it to your flash unit.

Correct exposure with electronic flash depends upon four factors:

- The power or light output of the flash unit
- The ISO speed of the film being used
- The flash-to-subject distance
- The f/stop setting

Shutter speed is not a factor since the time of exposure is governed solely by the duration of the flash.

Notice we always speak of *flash-to-subject distance*, never camera-to-subject distance. With all types of artificial illumination (the same as with

sunlight), the only consideration is the amount of light reflected from the subject. The distance between the camera and the subject has no bearing on exposure. When the flash is used off of the camera, the basic f/stop is still calculated with the flash-to-subject distance.

AUTOMATIC ELECTRONIC FLASH UNITS

Most electronic flash units can be operated in an automatic exposure mode. An automatic flash unit eliminates the need to determine the correct f/stop for each flash-to-subject distance, providing the subject is within the flash distance range of the unit.

On the front of an automatic flash unit, a sensor reads the light reflected from the subject that is produced by the flash. When this sensor is satisfied with the amount of light received, it automatically shuts off the flash. The closer the subject is to the lamp, the quicker the sensor shuts off the light.

Some automatic electronic flash units allow you to select two or more apertures to control depth of field. To determine an f/stop in the automatic mode, you can use the calculator dial, located on the unit that is being used. By matching the indicator to an ISO film speed number on the dial, you can use the f/stop within a minimum and maximum distance. Once an f/stop is selected and set, it becomes a constant factor regardless of the flash-to-subject distance, providing it is within the flash distance range of the unit. This feature allows the photographer to move closer to or farther away from a subject without having to calculate an f/stop for each change of flash-to-subject distance (fig. 5-25).

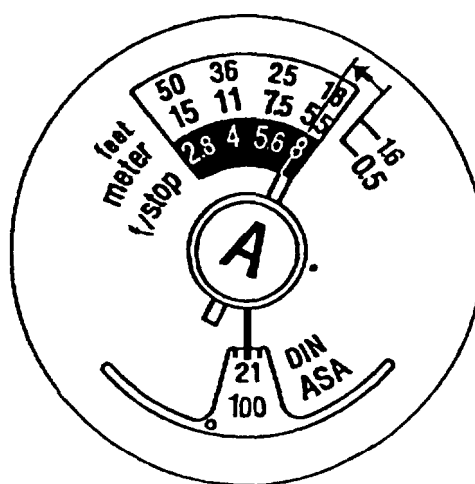
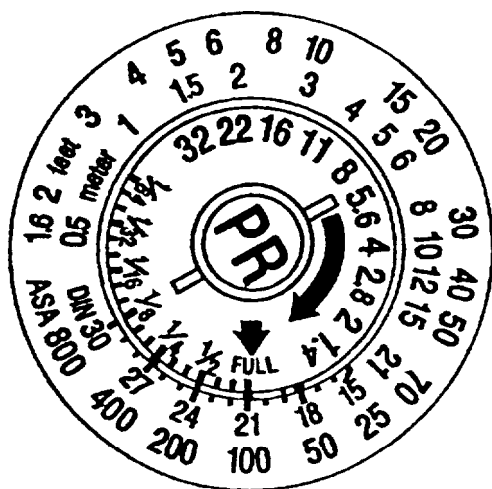


Figure 5-25.—The automatic operating range, using J50 100 film at f/2.8, is 1.6 to 50 feet.

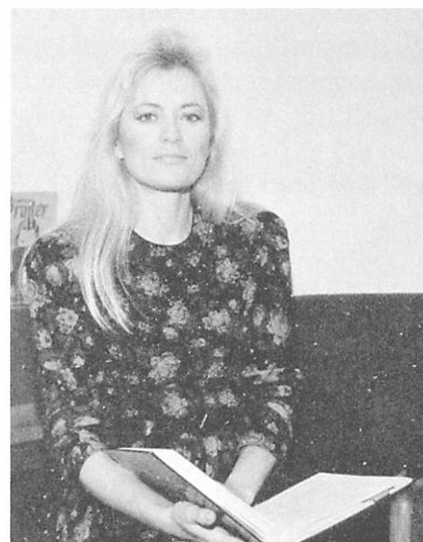




DIRECT FLASH



DIFFUSED FLASH



BOUNCE FLASH

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Figure 5-27.—Effects of direct, diffused and bounce flash.

situations where there is a 8- to 10-foot-white ceiling. Your photographs of reenlistments, frockings, awards, and so forth, will have a more pleasing effect.

Most bounce flash pictures are made with the light directed at the ceiling, either above the photographer or above the subject, or somewhere between. A silhouette effect can be produced by bouncing your flash off the ceiling behind the subject. To accomplish this, aim your flash unit so most of the light bounced off the ceiling falls on the background behind the subject and calculate the exposure for the background.

For the flattest bounce light, try bouncing the light off a wall behind the camera. With this lighting, you will have practically no shadows. Here, you have to calculate your exposure based on the flash-to-wall-to-subject distance.

For side lighting, bounce your flash off a wall to the side of your subject. This type of lighting helps add a feeling of three dimensions to your picture.

For the best control, use a large reflector designed for bounce lighting. Special-made reflectors are available that are lightweight, compact, and portable. For closeup work, the best bounce reflector is about 3 by 4 feet square. For full-length subjects, try a reflector about 6 by 6 feet.

To determine the exposure for bounce flash using the manual mode on your flash, you must determine the flash-to-ceiling-to-subject distance and determine your

f/stop and then open the aperture two additional f/stops. The two additional f/stops are added to compensate for loss of light due to scattering and absorption by the reflecting surface.

When an automatic flash is used in the automatic mode, it is not necessary to open up two f/stops. The sensor automatically cuts off when the proper amount of light is reflected from the subject to the flash unit.

When the ceiling is high or dark, a compensation to the basic exposure may be required. For effective use of the bounce-flash technique, a considerable amount of practice is required. As with any flash photography technique, identify any areas or surfaces that may be potential problems. Remember, one of the basic principles of reflected light is that the angle of incidence is equal to the angle of reflectance. Highly polished or glass surfaces should be considered before the subject is photographed. Items, such as windows, glass tabletops, glass framed photographs and polished metal, can cause glare or a "hot spot" in your photograph. When you are using bounce lighting techniques, "hot spots" of vertical surfaces are normally prevented, because the light source striking the surface is angled from above or the side; however, when you are using bounce lighting techniques, horizontal surfaces, such as glass coffee tables and overhead light fixtures, can cause a strange diffused lighting pattern in the photograph.

When using a single, on-camera flash, experiment with direct, diffused, and bounce-flash techniques and

determine which method provides the best results under various conditions. The method you choose to light the same subject separates you from the average snapshot shooter (fig. 5-27).

Off Camera Flash

Some of your best flash pictures can be made with the flash unit off the camera. Holding the flash off the camera and above the lens tends to throw the shadows down and behind the subject. This is a good way to minimize distracting background shadows that occur when a subject is standing close to a wall. A flash held high above the lens, either left or right, makes the viewer less conscious of the flash illumination. People are accustomed to seeing things lit from above, and by placing the flash above the subject, it closely resembles the lighting of the sun or ceiling lights.

Light that is far enough off the camera to illuminate the subject from an angle produces modeling or roundness. This type of light creates the illusion of a third dimension—depth—and is more pleasing to the viewer than the two-dimensional flat effect you get with direct, front lighting. Light from an angle can also be used to bring out the texture of a subject.

Indoors, two factors are important when determining the modeling and texture effects you will get: first, the surface of the subject itself; second, the way you light that subject. To illustrate these points, try photographing a Ping-Pong ball and a tennis ball together. When you use direct, front lighting, your picture records a two-dimensional visualization of height and width, but little of roundness, depth, or texture. When you light the balls from the side, both acquire the illusion of depth; however, only the tennis ball reveals texture. The Ping-Pong ball is much smoother and is almost textureless.

Now substitute a young child and an old person for the balls. With frontlighting, most of the lines and wrinkles in the old person's face will be minimized by the evenness of the light; however, when lighted from the side, almost every crease will become a shaded area and the ridges will be highlighted. Thus the texture of the old person's face is emphasized. The child, on the other hand, when side lighted, is still almost textureless just as in the case of the Ping-Pong ball.

LIGHTING RATIO

Lighting ratio can be considered as a measure of contrast. Lighting ratio refers to the combined intensity (at the subject) of the main and fill lights as compared

to the intensity of the fill light alone; for example, both the main and fill light of equal intensity are shining on the subject. A reflected light meter reading is taken off an 18-percent gray card at the subject position that indicates there are 100 units of light falling on the subject. Now, with the main light turned off and the fill-in light still illuminating the subject, the reflected meter reading indicates there are only 50 units of light falling on the subject; therefore the lighting ratio is 2 to 1. Lighting ratio is usually expressed as the comparison of two light intensities, such as 1:1, 2:1, 3:1, and so on.

The largest number in a lighting ratio indicates the most intense illumination at the subject position; for example, a 2:1 ratio indicates the most intensely lighted portion of the subject (highlights) is receiving twice the amount of illumination as the least intensely lighted portion of the subject (shadows). The light that produces the most intense illumination is called the main, key, or *modeling* light. The light that produces the least intense illumination is called the fill, or fill-in. A fill or fill-in light, as the name implies, fills in and softens the shadows produced by the main light.

Because a lighting ratio is a comparison of the combined main and “fill light” illumination intensities to the fill light illumination intensity alone, the fill light must be in a position so it completely illuminates the portion of the subject visible to the camera. This requires positioning the fill light close to the lens.

As a rule, 3:1 lighting is considered the best general lighting ratio for both black-and-white and color photography. This 3:1 ratio provides normal contrast between the highlights and shadows and produces good natural-looking photographs.

Some automatic electronic flashes allow you to control the output of light. When set in the manual position, you can adjust the light output by changing the intensity of the flash unit to 1/2, 1/4, 1/8, 1/16, and so forth. This allows you more control of flash-to-subject distance as well as aperture (depth of field) control.

Achieving the desired lighting ratio with an automatic flash unit where the flash intensity can be controlled is quite easy. To achieve a 2:1 ratio, you set both flash units at the same distance and at the same intensity (either full power, 1/2, 1/4, and so on). To achieve a 3:1 ratio, set both flash units at the same distance and set the main light flash at full power and the fill flash at one-half power. A 5:1 or even higher lighting ratio can be obtained by setting both flash units at the same distance and the main flash at full power and the fill flash at one-fourth power, and so on. In order to

select a wider aperture to control depth of field, start by setting your main flash at one-half or one-fourth power and adjust your fill flash appropriately.

Adjusting lighting ratios by flash-to-subject-distance is another method to control lighting ratios. An easy way to calculate footage for a 3:1 ratio with two lights of equal intensity is to think of the full f/stops (2, 2.8, 4, 5.6, 8, 11, 16, 22, etc.) as distances in feet. Place the main light at the desired distance closest to one of the "f/stops," and place the fill light at the distance indicated by the next larger number; that is, 5.6 feet and 8 feet or 16 feet and 22 feet, and so on.

Another easy method to control the lighting ratios using an automatic electronic flash is to use the flash unit in the automatic mode. When set in the automatic mode, the flash-to-subject distance is not supercritical, and there is some leeway as long as the flash units are within their operating range.

To obtain a 2:1 lighting ratio, you simply have both flash units set at the same automatic setting and at approximately the same distance from the subject. For a 3:1 lighting ratio, use the same automatic setting and approximately the same flash-to-subject distances, but set the fill flash at twice the film speed as the film being used (main flash setting). For a 5:1 or even higher lighting ratio, use the same automatic setting and approximately the same flash-to-subject distance and set the fill flash at four times more than that of the main flash, and so on.

Any lighting ratio can be obtained when using an automatic flash unit. By controlling the power output intensity, adjusting the film speed setting, changing the main and fill flash distances, or a combination of the three, you can manipulate the lighting ratio easily to any ratio. As with any stage of photography, practice and testing with your camera and flash combinations in various situations produces the best results.

SYNCHRO-SUNLIGHT

Bright sunlight, used as the only means of illumination for an exposure, can produce deep objectional shadows on a subject. When a flash unit is used as a fill-in source of illumination, it reduces these shadows and is known as synchro-sunlight photography.

Improperly handled, the synchro-sunlight technique can produce an effect that makes the photograph appear as if taken at night with a single flash. This effect occurs when the flash illumination is more intense than the sunlight.

The first step for proper exposure with synchro-sunlight is to calculate the correct exposure for daylight, and set the shutter speed and f/stop as though a flash is not being used; however, keep in mind when using a focal-plane shutter, the shutter speed must be synchronized with the electronic flash unit. Avoid using a fast film in bright sunlight when using a camera equipped with a focal-plane shutter. In this case, you are limited only to your aperture to control the exposure of the film, because your shutter speed is nonadjustable. A leaf shutter has an advantage over a focal-plane shutter. When a leaf shutter is used, it provides more control over depth of field since the shutter synchronizes at all shutter speeds.

When you are using an automatic flash, the same principles apply for synchro-sun that were explained in the section for lighting ratio. The sun is used as the main light, and your camera settings are determined directly from your light meter. The easiest method is to set the film speed (ISO) on your flash unit to twice the film speed being used for a 3:1 lighting ratio and four times the film speed being used for a 5:1 ratio. A fraction of the manual power output can also be used to achieve the desired lighting ratio.

Remember to compensate your exposure by opening up two f/stops for a backlit subject and one f/stop for a subject that is sidelighted when taking your light meter reading from a distance. For color photography, you should normally use a 2:1 or 3:1 lighting ratio. For black-and-white photography, a ratio of 3:1 to 5:1 is acceptable.

MULTIPLE-FLASH UNITS

Multiple flash is the use of two or more flash units fired in synchronization with the camera shutter. The flash units can be auxiliary flash units, connected to the camera by extension cords, or they can be slave flash units. Slave units usually have self-contained power sources and are fired with a photoelectric cell when light from a master flash unit strikes the cell of the slave unit.

With multiple flash, exposure calculations are based on the distance between the subject and the flash unit that produces the most intense illumination to the subject; therefore, you can have numerous auxiliary flash units or slaves for a scene and only calculate your exposure from the mainlight source. All other flash units should be equidistant or at a greater distance from the subject as compared to the flash unit on which the exposure is based.

When two flash units of equal intensity and at equal distance from a subject illuminate the same area, the exposure for one unit should be determined and then the exposure should be halved because twice the intensity of light is reflected from the subject.

OPEN FLASH

Flash pictures can be made without the camera shutter and flash being synchronized, using a technique called open flash. In the open-flash method, the camera shutter is set at T or B, the shutter is opened, the flash unit fired, and the shutter closed. The open-flash technique is sometimes used when the level of light over a large scene is very low or at night. This method of flash photography allows the photographing of large scenes that ordinarily are quite difficult to illuminate with artificial light. The photographer can walk into a scene with the flash unit and illuminate sections of the scene or the entire scene. Any number of flashes can be used during the exposure while the shutter remains open. A silhouette of your body can be recorded if your body gets between the flash and the camera.

To arrive at the exposure for an open-flash picture using a manual flash, determine your flash-to-subject distance and f/stop. Keep the distance equal to the objects being illuminated when using manual flash; for example, when the f/stop for the scene is f/5.6 based on a flash-to-subject distance of 10-feet, every flash within the scene should be 10 feet from that section of the scene being illuminated. When an automatic flash is used, the flash automatically shuts off when the proper amount of light is reflected from the subject, providing the object is within its distance range. When you are using a manual flash, the exposure for open flash is determined as previously discussed. This is true unless two or more flash units with equal intensities are used at equal distances, or two or more flashes from the same unit at the same distance are used to illuminate the subject.

MULTIPLE EXPOSURES WITH ELECTRONIC FLASH

Interesting multiple exposures can be made with only one or two electronic flash units. Multiple exposure pictures, besides being artistic and interesting, are often used to study subject motion and position. This can be accomplished by the following procedures:

1. Darken the room and position your subject against a black background.

2. Allow enough background area for the number of different exposures you intend to make. When you

are using a ground glass camera, mark off on the glass, with grease pencil, the areas where the subject should be for each different exposure. If not using a ground glass camera, make a pencil sketch to help you position the subject.

3. Set up the electronic flash lights so the minimum amount of illumination falls on the background itself.

4. Turn off all room lights and make your first exposure. Then, without advancing the film, move your subject to the next position for the second exposure. Repeat this procedure for each image you want to record on the film.

PHOTOGRAPHING ACTION WITH ELECTRONIC FLASH

Action of any kind, no matter how slight, can add interest to most pictures. Each type of action requires a different camera technique, but because of the short duration of light from electronic flash, it is ideal for recording any action ranging from a fleeting expression to a sports triumph. Most electronic flash units have a maximum flash duration (the length of time the light is on) of about 1/800th second, and a minimum flash duration as short as 1/20000th second, thus you can “freeze” almost any action with the flash.

Indoors, where there is little existing light, you have no problem because the electronic flash itself stops the action; however, outdoors in daylight, you may encounter ghost images. Ghost images can occur when existing light and a slow shutter speed are used in conjunction with electronic flash. A ghost image appears as a blur when one image is recorded by the existing light and a second sharp image by the electronic flash.

ELECTRONIC FLASH AT NIGHT

Flash photography, outdoors at night, can produce very underexposed photographs if not taken properly. Outdoors, flash does not carry very far; therefore, it can be difficult to light objects from a distance; however, this limited coverage also gives you great control. Indoors, part of the output of a flash unit is reflected from the ceiling and walls back to the subject. Rarely do you find such reflective surfaces outside, so some light is lost. To compensate for the light lost, you must open up your aperture when photographing objects at any distance. Because so much light is absorbed in these large areas, it may not be uncommon to open up your aperture two or three f/stops. Tests should be conducted before shooting in large, indoor areas, such as gymnasiums and hangar bays or outdoors at night, to

determine which flash, camera, and film combination produces optimum results.

At night a single on-camera flash produces stark lighting, and your subject is flatly lit and the background goes completely black. Close foreground details become very overexposed, and it is better to exclude them. Such simple lighting is ideal for action shots; for example, capturing leaping karate experts in midair at midnight. Subjects such as these benefit by being isolated from the background, but you may get more interesting lighting by using the unit off camera on an extension cord.

If the necessary flash-to-camera distance is greater than the length of your extension cord, use the open-flash method. Do not allow the camera to “see” the flash unit during the open-flash exposures.

Now that you have a basic knowledge of photographic techniques, it is important that you apply and practice the basic principles. Each and every time you pick up a magazine, book, or newspaper or watch TV or see a movie, you are exposed to various composition and lighting techniques. Study them and apply them every time you look through the viewfinder of a camera. Remember, experiment with different camera angles to create interesting perspectives of your center of interest. Whether using available light or flash photography, notice what results the direction, intensity, and type of light have on your final product. Continual application and refinement of the principles of composition and lighting can greatly enhance the quality and aesthetic value of your photography.

